Type 944U Polypropylene Film Capacitors for DC Filtering

Metallized Polypropylene Dielectric

Type 944U is specifically designed for use in medium power DC filtering applications. Thelow inductance internal construction utilizes low loss metallized polypropylene for high ripple current capability. Male or female terminal options offer design flexibility in a rugged UL 94VO rated flame retardant plastic case and resin fill.

Applications

Inverters: DC Link
DC Output Filter

Specifications

RoHS Compliant

Complies with the EU Directive 2002/95/EC requirement restricting the use of Lead (Pb), Mercury (Hg), Cadmium (Cd), Hexavalent chromium (Cr(VI)), PolyBrominated Biphenyls (PBB) and PolyBrominated Diphenyl Ethers (PBDE).

Capacitance Range: 33 µF to 220 µF
Voltage Range: 800 Vdc to 1400 Vdc
Capacitance Tolerance: ±10% standard
Operating Temperature Range: –40 ºC to +85ºC
Dielectric Withstand: 150% Rated Vdc 10s - Between Terminals
4000 Vac 60s - Terminals to Case

Ratings

Catalog Part Number	Cap (µF)	Rated Voltage (Vdc)	H Height (mm)	H Height (in)	Max ESR 10kHz (mΩ)	Typical ESL (nH)	Max Irms 55ºC (A)	Thermal Resistance	
								Θcc (ºC/W)	Θca (ºC/W)
944U101K801AA*	100	800	40	1.67	0.5	20	74	2.8	5.2
944U161K801AB*	160	800	51	2.01	0.8	30	73	3.0	4.5
944U221K801AC*	220	800	64	2.52	1.0	40	72	3.1	4.0
944U660K102AA*	66	1000	40	1.67	0.6	20	70	2.8	5.2
944U101K102AB*	100	1000	51	2.01	0.8	30	68	3.0	4.5
944U141K102AC*	140	1000	64	2.57	1.0	40	65	3.1	4.0
944U470K122AA*	47	1200	40	1.67	0.7	20	67	2.8	5.2
944U700K122AB*	70	1200	51	2.01	1.0	30	65	3.0	4.5
944U101K122AC*	100	1200	64	2.57	1.3	40	64	3.1	4.0
944U330K142AA*	33	1400	40	1.67	0.8	20	64	2.8	5.2
944U520K142AB*	52	1400	51	2.01	1.1	30	60	3.0	4.5
944U700K142AC*	70	1400	64	2.57	1.4	40	59	3.1	4.0

*** M = M8 Stud   I = M5 Insert**

Additional values available upon request.

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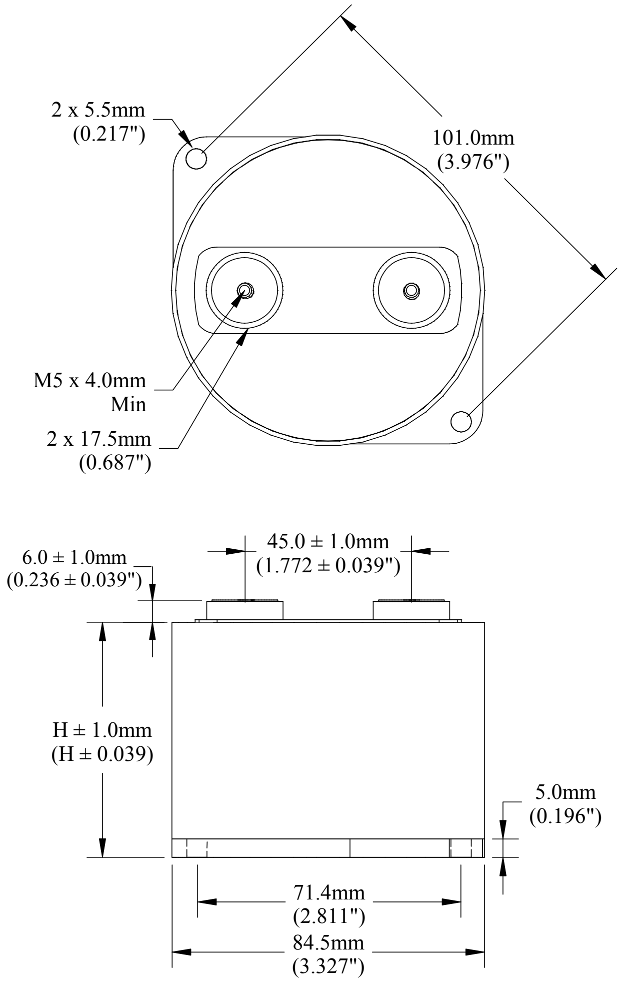
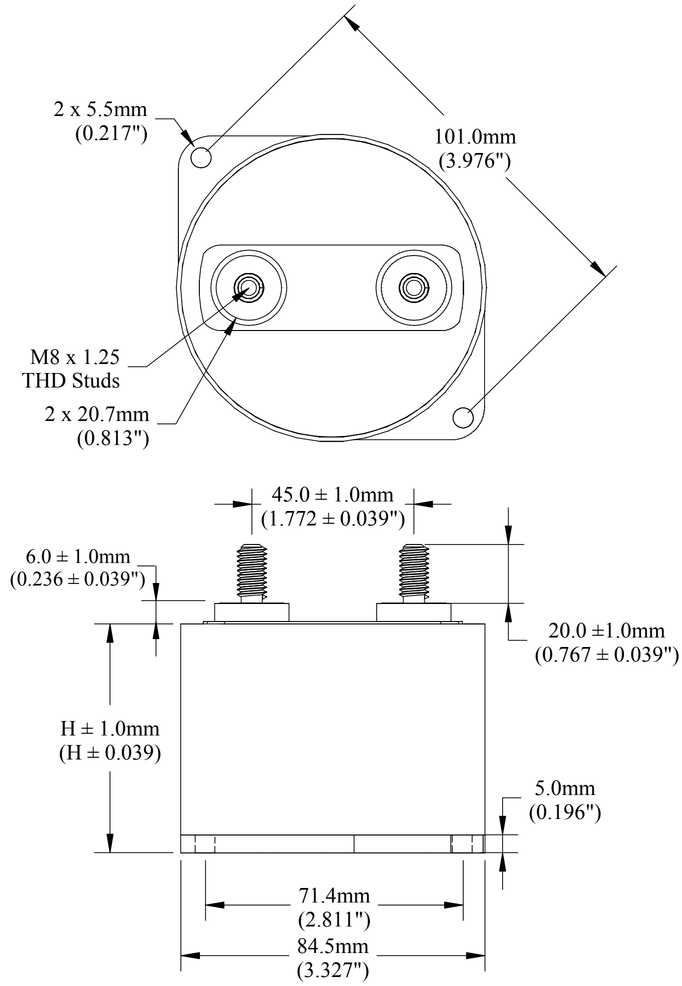
Outline Drawing

Dimensions: Millimeters (Inches)
H dimension in Ratings Table

I Suffix



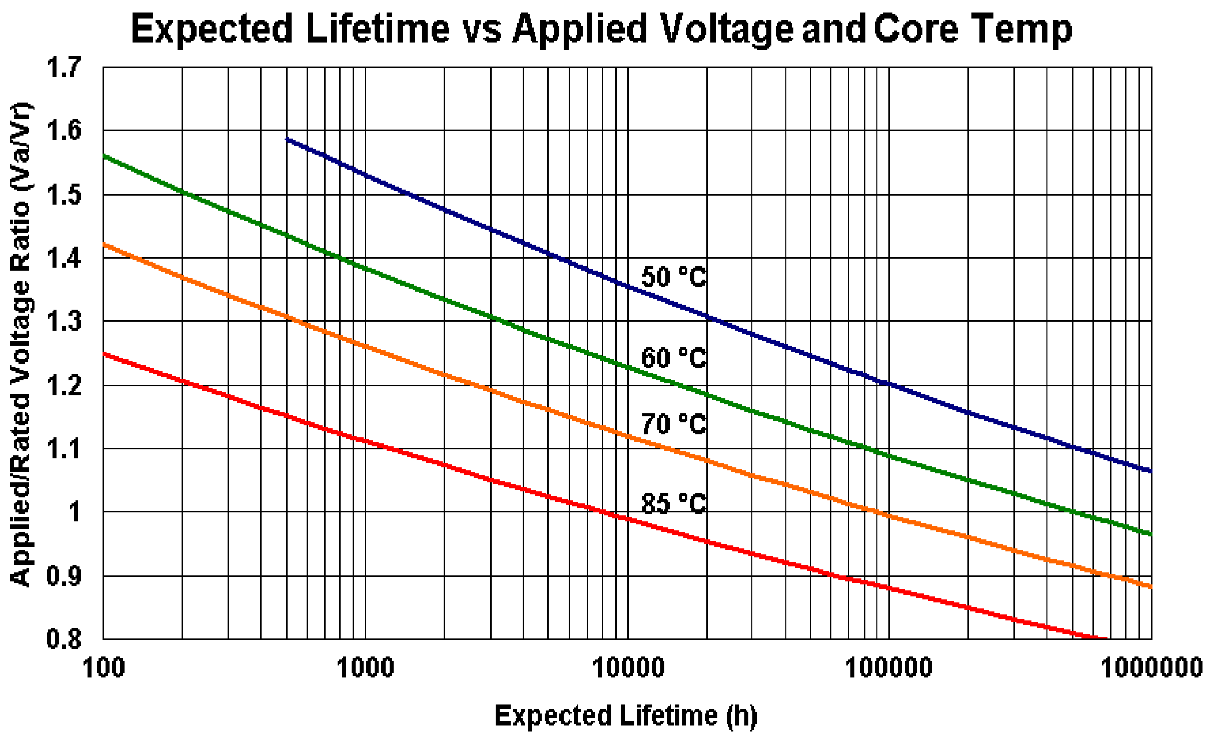
M Suffix



Tolerance ±0.5mm (±0.019"), otherwise specified

Part Numbering System

944U	101	K	801	A	A	M
Type	Capacitance	Tolerance	Voltage	Diameter D (mm)	Height H (mm)	Terminal
944U	101 = 100 µF	K = ±10%	801 = 800 Vdc	A = 84.5	A = 40	M = M8 Thd Stud
	700 = 70 µF		102 = 1000 Vdc		B = 51	I = M5 Thd Insert
	470 = 47 µF		122 = 1200 Vdc		C = 64	
			142 = 1400 Vdc			



Expected Lifetime Predictions

To use the Expected Lifetime curves calculate Va/Vr and core temperature T. Start by estimating:

- Applied dc voltage Va
- Ripple Current I
- Ripple Frequency f
- Ambient Temperature Ta
- Airflow speed v

Units:

$A=m^2$	T, Ta & Tc=°C
C=μF	θ, θca & θcc =°C/W
ESR=mΩ	v=m/s
f=kHz	Va &Vr=Vdc
I=A	

NOTE: The temperature rise in the 944U is I^2(ESR) times the thermal resistance θ. The ESR is mainly the metal resistance; the metal resistance is the 10 kHz ESR. For operation below 10kHz add the dielectric resistance. It is the dielectric dissipation factor—no more than 0.0002—times the capacitive reactance, i.e., $0.0002/(2\pi fC)$.
That's equal to $31.83/(fC)$.

1. Start with the 10 kHz ESR from the Ratings table. If frequency is less than 10 kHz, add $31.83/(fC)$.

2. Compute total thermal resistance θ as the sum of core-to-case thermal resistance θcc and case-to-ambient thermal resistance θca. Both are in the Ratings table but θca is for still air and θcc is for 10 kHz or less. For frequency > 10 kHz multiply θcc by $[1+(f-10)/100]$, e.g., for 75 kHz multiply θcc by 1.65. For moving air use the capacitor surface area A and airflow speed v to calculate $\theta ca = 1/[A(5+17.5(v+0.1)^{0.66})]$.

3. Compute Va/Vr and the core temperature T.
$T = Ta + I^2(ESR)\theta$

4. Look up estimated lifetime from the Expected Lifetime curves.

5. If you want a longer expected lifetime, choose a capacitor with higher voltage rating or consider using multiple capacitors in parallel to share the ripple current.

Permissible Voltage Surge Duty for 100,000 Hour Life Expectancy at 50 °C Core Temperature

Factor	Duration	Frequency
1.67x	t≤ 100 ms	1x/day
1.50x	t≤ 5 minutes	1x/day
1.30x	t≤ 2.5 hours	1x/day
1.10x	t≤ 9.6 hours	1x/day
1.00x	balance (11.9 h)	1x/day

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Typical Performance Curves